DOCUMENT RESUME

ED 344 749 SE 052 557

TITLE Starting Today: A Guide to Improving Texas Mathematics Programs for the 1990s.
INSTITUTION Texas Education Agency, Austin.
REPORT NO TEA-GE1-621-01
PUB DATE 91
NOTE 26p.
PUB TYPE Guides - General (050) -- Reports - General (140)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Curriculum Development; Educational Assessment; Educational Improvement; Elementary Secondary Education; *Mathematics Curriculum; *Mathematics Education; *Mathematics Tests; *Program Descriptions; *State Programs
IDENTIFIERS *Texas

ABSTRACT

In the midst of national education reform and in line with efforts to describe national standards for school mathematics, Texas is taking an aggressive role in reforming mathematics in the public schools. Ways that Texas schools, the Texas Education Agency, and the State Board of Education are addressing the dramatically changing needs of mathematically literate citizens for the 21st century are described. This document includes: (1) the rationale and purpose behind the new directions for school mathematics programs in Texas; (2) the schedule of adoption and implementation for revised essential elements for the catalog of Texas school mathematics courses; (3) the schedule for state adoption of textbooks by school mathematics course; (4) the pertinent evolutionary aspects of the three phases of the statewide assessment programs; (5) the objectives of the current statewide assessment program, the Texas Assessment of Academic Skills (TAAS); (6) a listing of strategies proposed for the improvement of students' performance on the TAAS; (7) an outline of the staff development program to support the ongoing changes in the mathematics essential elements, textbooks, and testing programs; and (8) a discussion of the requirements for teacher empowerment and curriculum development that are deemed necessary for successful improvement efforts at the classroom level. (JJK)

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STARTING TODAY:

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A GUIDE TO IMPROVING TEXAS MATHEMATICS PROGRAMS FOR THE 1990s

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A GUIDE TO IMPROVING TEXAS MATHEMATICS PROGRAMS FOR THE 1990s

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FOREWORD

In the midst of national education reform and in line with efforts to describe national standards for school mathematics, Texas is taking an aggressive role in reforming mathematics in the public schools. *Starting Today: A Guide to Improving Texas Mathematics Programs for the 1990s* describes a number of ways that Texas schools, the Texas Education Agency, and the State Board of Education are addressing the dramatically changing needs of mathematically literate citizens for the 21st century. The Agency is committed to supporting local school efforts to improve mathematics teaching and learning for all Texas students. Every child in the diverse population of the state must be equipped to solve high-level problems of all kinds, and every teacher must be equipped to teach toward that end.

Thomas E. Anderson
Interim Commissioner of Education

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Note: To complement this document, a set of blackline masters for overhead transparencies is available from the Texas Education Agency. These masters, contained in Publication GE1 621 02, may be useful to school districts in conducting inservice awareness presentations for teachers, administrators, counselors, parents, and the community. Request the set of masters by writing to the Publications Distribution Office, Texas Education Agency, 1701 N. Congress Avenue, Austin, TX 78701-1494.

New Directions for Texas Mathematics in the 1990s

In 1984, school districts across the state began implementing new State Board of Education rules for curriculum. These rules, specified in Title 19, Chapter 75 of the Texas Administrative Code, provided Texas educators with essential elements of instruction for all subject areas, including mathematics. The essential elements are the components of curriculum content that Chapter 75 requires school districts to teach in every subject and in each course of the state curriculum. They have provided a framework for state-level documents such as the *Mathematics Framework*, school district curriculum guides, teacher lesson plans, and state-adopted textbooks. They also have been the foundation for the statewide student performance assessments, TEAMS and TAAS.

A State Board rule provides for a comprehensive review of Chapter 75 every five years. The rule includes a directive to make changes in actual essential elements for a course or subject in conjunction with the state's adoption of textbooks for that course or subject. This rule provides for continuity and long-range planning by districts.

In mathematics, many indications predict that some degree of curriculum change will be appropriate for the next several years, with additional changes likely to continue into the 21st century. Forces for change include:

- dissatisfaction with student performance
- research on the redundancy in the current United States mathematics curriculum (McKnight et al., 1987)
- research on topics such as curriculum (McKnight et al., 1987), stages of development (Carpenter, 1980; Fuys, Geddes, and Tischler, 1988; Texas Education Agency, Summer 1990), metacognition (Romberg and Carpenter, 1986; Schoenfeld, 1987; Wittrock, 1986), effective teaching practices (Cooney, 1980; Good and Grouws, 1981; Wittrock, 1986), and the impact of technology in mathematics classrooms (Hembree and Dessart, 1986)
- a dramatic shift in the mathematics that citizens need in our increasingly technological society (Mathematical Sciences Education Board, 1989)
- changing expectations for individuals entering the workforce (Johnson, 1987) (See page 16.)
- new and different careers (Johnson, 1987; Krantz, 1988)
- the need to more thoroughly educate the total population (Mathematical Sciences Education Board, 1989)

None of these forces requires replacing the current curriculum with an entirely new curriculum, although a substantial step toward change is undoubtedly necessary with each new call for textbooks.

Each year specifications for the development of textbooks are issued in a document entitled, *Proclamation of the State Board of Education Advertising for Bids on Textbooks*. Under new guidelines, textbook proclamations and the corresponding essential elements will be developed over a two-year period prior to their adoption by the State Board. Districts will then have over three years to prepare for implementation of new and revised essential elements. Clearly, with this timeline, each revision must be well planned and must be forward thinking. Mathematics educators at the school, district, region, university, and state level must view the decade of the 90s as the time to make a difference with all students.

For the next several years, general directions in mathematics education will include:

- an increased emphasis on students' solving relevant real-world problems
- opportunities to connect the various branches of mathematics and to connect mathematics to other disciplines
- the use of technology and other problem-solving tools in mathematics classrooms
- the application of mathematics to the real world
- more focused instruction on fewer topics at each grade level
- the integration of ongoing review of previously learned topics in relevant contexts
- instruction in the full mathematics curriculum for all students
- a program based on concepts rather than on mechanical procedures
- students' development of mathematical power — the knowledge that they can use mathematics in many powerful ways in their lives

These directions are consistent with those described at the national level in the National Council of Teachers of Mathematics' *Curriculum and Evaluation Standards for School Mathematics* (NCTM, 1989). The *Standards* support the following five goals for students from kindergarten to Grade 12:

- learning to value mathematics
- becoming confident in one's own ability
- becoming a mathematical problem solver
- learning to communicate mathematically
- learning to reason mathematically

Teaching toward these goals clearly involves a substantial commitment of instructional time at all grade levels. For example, many teachers have discovered that spending at least 60 minutes daily on mathematics allows time to involve students in cooperative, problem-solving activities using manipulative materials. Time should be structured to ensure maximum engaged student time focused on developing mathematical meaning and understanding. Instructional time in mathematics can be enhanced by emphasizing the connections between mathematics and other subject areas. Applications from science, social studies, language, health, physical education, fine arts, and other areas can provide a vehicle for mathematical problem solving and can enhance the understanding of both mathematics and other subject areas. This does not mean, however, that less time should be spent on either mathematics or the other disciplines when connections are made, since the actual teaching of these content areas should be specifically addressed. It does mean that teaching in all disciplines should be interrelated to maximize student learning for the future.

To support schools and teachers in upgrading mathematics programs, several parallel efforts must take place. Improvement in Texas mathematics programs involves:

- **essential element revision** (three to five years ahead of implementation; a six- to seven-year cycle)
- **textbook adoption** (one year ahead of implementation; a six- to seven-year cycle)
- **state test revision** (TABS / TEAMS / TAAS / etc.; a separate five-year cycle)
- **Texas Mathematics Staff Development Program** (state, region, local level; ongoing)
- **local improvement efforts** (in conjunction with changes in essential elements, new textbooks, test revision, or ongoing)

Several videotapes are available that describe various aspects of these efforts. (See list of Texas Education Agency videotapes on page 15.)

Schedule for Essential Element Revision

Revised essential elements in mathematics have been and will be adopted by the State Board of Education according to the following schedule:

Course or Subject	Adopted by SBOE	Implementation by
Fundamentals of Mathematics	Fall 1989	Fall 1989
Consumer Mathematics	Fall 1989	Fall 1989
Calculus	Fall 1989	Fall 1989
Algebra I, II	Fall 1989	Fall 1990
Geometry	Fall 1989	Fall 1990
Trigonometry	Fall 1989	Fall 1990
Mathematics 1-8	Fall 1989	Fall 1991
Pre-Algebra	Fall 1990	Fall 1992
Informal Geometry	Fall 1990	Fall 1992
Mathematics of Money (formerly MOCE)	Fall 1990	Fall 1992
Precalculus	Spring 1991	Fall 1994
Analytic Geometry	Spring 1991	Fall 1994
Elementary Analysis	Spring 1991	Fall 1994
Fundamentals of Mathematics	Spring 1992	Fall 1995
Consumer Mathematics	Spring 1992	Fall 1995
Calculus	Spring 1992	Fall 1995

Districts are encouraged to implement the revised essential elements at any time prior to the dates listed above. The general direction for revisions are those described on pages 1-2, supporting the NCTM's *Curriculum and Evaluation Standards for School Mathematics* and focusing on all students becoming proficient problem solvers who can think quantitatively in a technological society.

The Agency is developing curriculum guidelines for mathematics, Grades 1-8, and for many of the high school mathematics courses. Each of these publications includes an overview, sample objectives, sample activities, information on the Texas Assessment of Academic Skills (TAAS), suggestions for evaluation, resources, and references. Guidelines are being made available to all districts and education service centers as they are completed.

Schedule for State Adoption of Textbooks

New textbooks have been and will be adopted by the State Board of Education according to the following schedule:

Course or Subject	Adopted by SBOE	In Classrooms
Fundamentals of Mathematics	Fall 1988	Fall 1989
Consumer Mathematics	Fall 1988	Fall 1989
Calculus	Fall 1988	Fall 1989
Algebra I, II	Fall 1989	Fall 1990
Geometry	Fall 1989	Fall 1990
Trigonometry	Fall 1989	Fall 1990
Mathematics 1-8	Fall 1990	Fall 1991
Pre-Algebra	Fall 1991	Fall 1992
Informal Geometry	Fall 1991	Fall 1992
Mathematics of Money (formerly MOCE)	Fall 1991	Fall 1992
Precalculus	Fall 1993	Fall 1994
Analytic Geometry	Fall 1993	Fall 1994
Elementary Analysis	Fall 1993	Fall 1994
Fundamentals of Mathematics	Fall 1994	Fall 1995
Consumer Mathematics	Fall 1994	Fall 1995
Calculus	Fall 1994	Fall 1995

Content descriptions and instructional strategies for textbooks must be consistent with proposed essential element revisions.

Statewide Assessment Programs

To date, mandated statewide testing of all students in selected grade levels has evolved through three phases — TABS (Texas Assessment of Basic Skills), TEAMS (Texas Educational Assessment of Minimum Skills), and TAAS (Texas Assessment of Academic Skills). The programs are characterized below:

TABS

- School districts implemented TABS from 1980-85.
- Students in Grades 3, 5, and 9 were tested.
- TABS was administered in the spring.
- Basic skills were tested at a fairly low level in reading, writing, and mathematics.

TEAMS

- School districts implemented TEAMS from 1985-90.
- Students in Grades 3, 5, 7, and 9 and at the exit level were tested.
- Originally, students in Grade 1 were also tested; the Legislature in 1989 eliminated the Grade 1 test.
- TEAMS was administered in the spring; the exit-level test was administered in the fall and spring.
- Exit-level mastery was required for graduation.
- TEAMS tested selected minimum skills taken from essential elements in reading, writing, and mathematics.
- TEAMS was more challenging for students than TABS.

TAAS

- TAAS will be implemented from 1990-95.
- Students in Grades 3, 5, 7, and 9 and at the exit level are tested.
- TAAS is administered in early fall; the exit-level test is administered in the fall and spring.
- Exit-level mastery is required for graduation.
- The test reflects the comprehensive curriculum; the complete set of mathematics essential elements is represented in TAAS.
- TAAS tests reading, writing, and mathematics.
- TAAS tests science and social studies as phased in during the test cycle.
- Problem solving in the mathematics curriculum is emphasized.
- The reading process and the writing process are emphasized.
- Objectives are identical for Grades 3, 5, 7, and 9 and exit level.
- Instructional targets vary for each grade level and may vary from year to year in terms of what is actually tested.
- Test items may test more than one target or objective and may require students to use thinking skills to apply what they have learned in different contexts.
- TAAS is more challenging than TEAMS, with an emphasis on higher order thinking skills.
- TAAS does not test essential elements that are no longer reflected in revised essential elements at a grade level.
- TAAS does not test new mathematics essential elements during 1990 or 1991.

TAAS Objectives
1990-1995

TAAS objectives have been designed to address the entire scope of the mathematics essential elements, with an emphasis on higher order thinking skills and problem solving. The objectives are the same in Grades 3, 5, 7, and 9 and exit level, providing consistent threads across the testing program. Instructional targets for these objectives at each level test essential elements from the previous two grade levels. For example, in Grade 3, essential elements from Grades 1 and 2 are tested. The test itself is somewhat unpredictable in that instructional targets may vary from year to year and some test items may actually include content from more than one objective or instructional target. Test specifications, including complete lists of instructional targets and sample test items, are available for each grade level for $1.00 per booklet from National Computer Systems, 1-800-252-9186 (Texas) or 512-835-4833 (outside of Texas). The objectives are:

Problem Solving

The student will:

- estimate solutions
- analyze problems and identify solution strategies
- express problems using mathematical representations
- evaluate the reasonableness of problem solutions

Concepts

The student will:

- demonstrate an understanding of the concepts of numbers
- demonstrate an understanding of mathematical relations, functions, and other algebraic concepts
- demonstrate an understanding of geometric properties and relationships
- demonstrate an understanding of measurement concepts using metric and customary units
- demonstrate concepts related to an understanding of probability and statistics

Operations

The student will:

- demonstrate skills, concepts, and applications related to addition
- demonstrate skills, concepts, and applications related to subtraction
- demonstrate skills, concepts, and applications related to multiplication
- demonstrate skills, concepts, and applications related to division

Strategies for Improving Mathematics Performance on TAAS

Teachers cannot adequately prepare students for TAAS by reviewing only a few narrow skills or by having students complete a few activities. The test has been designed to focus on higher order thinking skills, and test specifications are deliberately broad. The entire mathematics curriculum is eligible for testing, and items may require students to synthesize concepts and skills in new contexts. The best preparation for TAAS is to teach an excellent mathematics program, focusing on the comprehensive curriculum outlined by the essential elements. Students in districts that are implementing revised essential elements with an emphasis on solving problems will be particularly prepared to perform well on the test. When teachers are weak in preparation to teach a particular essential element, they should be given an opportunity to participate in appropriate modules from the Texas Mathematics Staff Development Program (see page 9). School and district officials wishing to improve students' performance on TAAS also may want to refer to suggestions given on improving mathematics programs (see pages 10-12).

Several general approaches to helping students improve performance on mathematics tests involving problem solving are applicable to improving performance on TAAS. The approaches include the following:

1. **Teach a comprehensive mathematics program to all students.** All students will need experience solving problems involving numeration, operations, patterns, geometry, measurement, probability, and statistics. Even students who are unsuccessful at computation should not be prevented from continuing their study of mathematics in other areas. The shifting nature of mathematics needed to function in our highly technological society requires that students use much more mathematics than computation. There is little, if any, evidence that students need a high level of computational proficiency to solve complex mathematics problems.

2. **Use manipulatives to develop concepts.** Whenever appropriate, students should use physical materials to help make mathematical concepts real, to give them a way to verify their thinking, and to help them approach mathematics from a concrete rather than from an abstract perspective.

3. **Stress the importance of the process of problem solving rather than the calculations.** Because the mathematics tested on TAAS calls more for solving problems than on performing isolated calculations, students should have opportunities to use a variety of problem-solving approaches in classroom situations. Even though calculators are not yet used on TAAS, students may benefit from using calculators and other problem-solving tools during class, thus allowing them to devote more time and attention to the steps in the process than to making the necessary computations.

4. **Encourage small-group, problem-solving activities.** Students tend to be more willing to express their ideas and/or difficulties to each other than to the entire class, and they may learn from ideas suggested by their peers. In addition, verbally communicating about a problem provides an effective approach to clarify thinking and to produce possible solutions. Collaborative group activities provide opportunities for such communication. Many excellent problems for such group activities are available in problem-solving resource books provided with mathematics textbooks.

5. **Provide opportunities for students to visualize problems.** Students who have had experiences with a variety of problems and students who have had experiences with manipulative materials should be able to use pictures, diagrams, sketches, or models to help in solving problems, whether or not such pictures or models are provided with the test.

6. **Stress the relevance of mathematics to students' daily lives.** Mathematics should be connected to relevant situations whenever possible. Real-life contexts and interesting situations should provide the setting for problems presented to students.

7. **Stress the connections within mathematics.** Geometry can be used to solve problems involving patterns or probability; statistics skills can be used to understand measurement problems; number sense and place value help to develop understanding of computational algorithms — mathematics should be viewed not as a set of isolated unrelated topics, but rather as an interesting web of interrelated concepts and understandings.

8. **Stress the importance of estimation.** Students must have experience in estimating the size of numbers, results of computations, and solutions to problem situations. This experience can lead to solving problems with understanding, rather than relying on rote procedures.

9. **Have students practice problems where there is not enough information or where there is too much information.** Problems on TAAS do not fit into neat categories nor will they always require one step or two steps for any given objective. In some cases, students will be asked what other information will be needed, or they will need to ignore extraneous information. This type of problem is more like real situations and can more truly test a student's ability to solve problems than a more predictable type of problem.

10. **Encourage multiple approaches to solving problems.** If presented properly, opportunities to brainstorm alternative approaches can reassure students that mathematics is not necessarily a right/wrong type of subject. This type of discussion should not focus on telling students a list of all the ways to solve a problem, but should be a true discussion where all ideas are welcome.

11. **Convey the appreciation of mathematics as a subject.** A teacher's attitudes about mathematics are easily absorbed by students. Students should be encouraged to develop their natural love of an interesting subject which they often express during their early years in school.

Adapted from: Richard Swartz, "Implications for Teaching," chap. in *The OFFICIAL Teacher's Guide to the Tests of General Educational Development,* GED Testing Service, The Center for Adult Learning and Educational Credentials (Chicago: American Council on Education, distributed by Contemporary Books, Inc., 1987) 115-116.

Texas Mathematics Staff Development Program

To support ongoing changes in the mathematics essential elements, textbooks, and testing program, the Texas Education Agency is administering a comprehensive statewide mathematics staff development program. The program has been funded by the federal Education for Economic Security Act (EESA), Title II, and is continuing under Dwight D. Eisenhower Title II funds. Twenty-five staff development modules, ranging in length from 12 to 30 clock hours, are approved for advanced academic training credit. These modules address the teaching of all essential elements for kindergarten through Grade 8 and for selected high school courses and topics. The modules are continually updated and revised to reflect new directions in mathematics education. For each module, at least two trainers per education service center (ESC) region are available to present teacher workshops. Each ESC has information on trainers, and districts are encouraged to use local Title II funds, either individually or co-oped through ESCs, to provide teacher training in the modules. Districts may also use other local staff development funds.

An elementary or middle school teacher, depending on grade level, could complete seven or eight appropriate modules over a period of one or more years. High school teachers may find several modules appropriate, depending on their teaching assignments. The following is a list of the available modules:

Module	Grades	Content Area
1	K-2	Numeration
2	K-2	Computation & Error Diagnosis
3	K-2	Geometry
4	K-2	Probability, Statistics, Graphing
5	3-6	Numeration
6	3-6	Computation & Error Diagnosis
7	3-6	Geometry
8	3-6	Probability, Statistics, Graphing
9	6-8	Measurement
10	6-8	Probability, Statistics, Graphing
11	K-2	Problem Solving
12	3-6	Problem Solving
13	6-8	Problem Solving
14	3-6	Measurement
15	6-8	Numeration/Computation & Error Diagnosis
16	6-8	Geometry
17	9-12	Geometry
18	K-2	Measurement
19	K-2	Calculators/Computers
20	3-6	Calculators
21	3-6	Computers
22	6-10	Calculators
23	6-10	Computers
24	9-12	Algebra
25	10-12	Precalculus: The Ohio State University Calculator and Computer Precalculus (C^2PC) Project
26	9-12	Fundamentals of Mathematics, Consumer Mathematics, and Pre-Algebra (available fall 1991)

For additional information, contact ESCs or Texas Mathematics Staff Development Project Director, c/o Texas Education Agency, Mathematics Section, 1701 N. Congress Ave., Austin, TX 78701-1494; (512) 463-9585.

Local Improvement Efforts

How does change occur?

Change is a complex process; it involves more than state-level mandates. Improved essential elements, textbooks, and tests and the availability of staff development modules are only part of the solution. True change takes place in individual classrooms. To effect change and empower students for success, teachers must be empowered as professional educators. Teacher empowerment requires:

- appropriate curriculum (state and local)
- textbooks that reflect future directions
- tests that support the curriculum
- staff development opportunities
- professional growth opportunities (conferences, workshops)
- professional resources (in the library, in the classroom)
- daily access to appropriate technology (calculators and computers)
- adequate manipulative materials
- appropriate class size
- an organizational structure that allows for mathematics specialists to teach mathematics at all levels
- support for teaching a complete mathematics program
- encouragement to try innovative techniques
- recognition for positive results (not just improved test scores)
- evaluation based on sound principles of teaching activity-based, problem-solving, concept-driven mathematics, not evaluation based on lecturing ability
- respect for the professional expertise of teachers

A major step toward empowering students involves providing access for all students to a relevant, comprehensive mathematics program within a relevant, comprehensive well-balanced school experience. Providing such access can be challenging if a student has not mastered previous skills, if a student is not motivated to study mathematics, if a student does not regularly attend school, if a student has emotional difficulties, and for many other reasons. Research on effective schools suggests that teachers' high expectations can make a substantial difference in student achievement (Kerman, 1979). Simply demanding more of students may not be enough, however. Schools also need to provide a variety of support programs to monitor student progress, encourage students who are having difficulties, provide frequent and timely intervention when students fall behind, diagnose areas of weakness, and remediate specific problem areas. Educators may need to remind themselves frequently that all students have the potential to learn. The movie *Stand and Deliver* has been provided on videocassette to all education service centers as part of the Texas Mathematics Staff Development Program. The true story depicted in this film is an excellent reminder for both teachers and students of what is possible even for students who apparently have little reason to succeed.

All school mathematics programs can be improved in some way, even programs that are effective. In evaluating local mathematics programs to determine areas of need and directions for improvement, educators should use a variety of measures, possibly including:

- an evaluation of student enrollment trends in high school mathematics courses (especially remedial vs. academic)
- an examination of students' mastery of grade-level essential elements at all levels

- teacher evaluations of students' readiness from previous grade levels or courses
- student test scores (e.g., from statewide assessments, standardized tests)
- follow-up data from students who have gone on to college, from students who have entered the workforce after high school graduation, and from students who have dropped out of school
- teacher suggestions, especially when teachers have the opportunity to meet with teachers from other levels
- teacher evaluations (TTAS), although appraisers must be careful not to equate quiet, lecture-based classes with high evaluations, since most mathematics learning takes place with a high level of student activity and discussion

After an evaluation of the mathematics program, district or school personnel should develop a systematic plan, targeting specific areas to be addressed. Such planning is appropriate even where a district has traditionally experienced high test scores. The plan should be comprehensive and should address curriculum updating and refocusing of instruction where appropriate. Staff development activities should be expected of all teachers, and other professional staff should work toward supporting teachers in improving classroom instruction. Many special activities may be incorporated into the plan. The following list is a sample of such activities:

- Designate a primary/intermediate/grade level person as the key communicator in mathematics.
- Order *Arithmetic Teacher* or *Mathematics Teacher* (journals of the National Council of Teachers of Mathematics*) and other professional journals for the school.
- Encourage and support teachers in attending appropriate inservice training sessions on mathematics.
- Encourage teachers to join professional organizations such as the National Council of Teachers of Mathematics and the Texas Council of Teachers of Mathematics.*
- Develop a plan for training all teachers with appropriate Texas staff development modules.
- Provide opportunities for inschool, inservice sessions on teaching mathematics.
- Encourage and support teachers in participating in mathematics conferences at the local, regional, state, and national levels.
- Institute a school mathematics group with the responsibility for reviewing and recommending manipulative materials, media sources, and resource books to be purchased.

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* The National Council of Teachers of Mathematics (NCTM) is a national professional organization for mathematics educators. Through its many publications and services, the Council is a forum for the discussion of new developments, a proven means of sharing innovative classroom experiences, and evaluating trends in the teaching of mathematics. More information is available from:

NCTM
1906 Association Dr.
Reston, VA 22091
Tel: (703) 620-9840
FAX: (703) 476-2970
CompuServe: 75445,1161

The Texas Council of Teachers of Mathematics (TCTM) is an affiliate of the NCTM. TCTM is devoted specifically to the interests of mathematics educators and dedicated to the improvement of classroom instruction in mathematics at all levels. Members of TCTM can take a vital and active role in mathematics education, both on a state level and within their communities. More information is available from:

Mathematics Section
Texas Education Agency
1701 N. Congress Avenue
Austin, TX 78701-1494
Tel: (512) 463-9585
FAX: (512) 463-9838

- Replace (or add to) math contests involving rote procedures with problem-solving events.
- Hold a math fair in the school.
- Generate a list of enrichment activities, guest speakers representing various careers, and field trips with mathematics components.
- Highlight successful and promising students or classrooms where exciting and relevant mathematics is happening.
- Increase (or implement) public relations efforts for mathematics through newsletters, parent involvement, student recognition, etc. (Stenmark, Thompson, and Cossey, 1986).

Who has the power to make change happen?

Improving mathematics learning by Texas students requires the attention of every educator — whether teacher, principal, curriculum supervisor, or other staff member — in every district in the state. Texas students will learn mathematics better than ever before if all of us make a commitment to that goal. The decade of the 1990s is more than the last decade of the 20th century; it is the bridge to the 21st century, and it is the decade we make a difference with every student we teach, starting today.

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Texas Education Agency Videotapes

1. Seeley, Cathy. "New Mathematics Essential Elements for Grades 1-8." *TI-IN*. Austin, TX: Texas Education Agency, October 31, 1989, (Tape 669, Part I, 45 minutes).

2. Seeley, Cathy. "New Mathematics Essential Elements for Grades 9-12." *TI-IN*. Austin, TX: Texas Education Agency, October 31, 1989, (Tape 669, Part II, 45 minutes).

3. Seeley, Cathy. "Texas Mathematics in the Nineties: The Decade We Make a Difference." *TI-IN*. Austin, TX: Texas Education Agency, March 6, 1990, (Tape 737, 45 minutes).

4. Seeley, Cathy, and Marilyn Rindfuss. "Education Service Center Mathematics/TAAS Training." Austin, TX: Texas Education Agency, June 4, 1990, (Tape 767, Parts I and II, 4 hours).

5. Seeley, Cathy. "A New Direction for Mathematics in Texas: The TAAS Test." July 1990, (35 minutes).

Videotapes 1-4 may be ordered from the Resource Center, Texas Education Agency, 1701 N. Congress Ave., Austin, TX 78701-1494. Be sure to include:

- return postage in U.S. stamps, not metered
- blank video of adequate length
- a return mailing label

Please package the tape(s) appropriately and insure to guarantee delivery. Also, be sure to indicate the tape number(s) and title(s) of the item(s) you wish to order.

Videotape 5 is available from the TAAS coordinator at each education service center.

Appendix

Industry's Expectations for Employees' Mathematical Abilities*

- the ability to set up problems with the appropriate operations
- knowledge of a variety of techniques to approach and work on problems
- understanding of the underlying mathematical features of a problem
- the ability to work with others on problems
- the ability to see the applicability of mathematical ideas to common and complex problems
- preparation for open problems situations, since most real problems are not well formulated
- belief in the utility and value of mathematics

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*According to Henry Pollak in NCTM's *Curriculum and Evaluation Standards for School Mathematics* (Reston, VA: National Council of Teachers of Mathematics, 1989), 4.

COMPLIANCE STATEMENT

TITLE VI, CIVIL RIGHTS ACT OF 1964; THE MODIFIED COURT ORDER, CIVIL ACTION 5281, FEDERAL DISTRICT COURT, EASTERN DISTRICT OF TEXAS, TYLER DIVISION

Reviews of local education agencies pertaining to compliance with Title VI Civil Rights Act of 1964 and with specific requirements of the Modified Court Order, Civil Action No. 5281, Federal District Court, Eastern District of Texas, Tyler Division are conducted periodically by staff representatives of the Texas Education Agency. These reviews cover at least the following policies and practices:

(1) acceptance policies on student transfers from other school districts;

(2) operation of school bus routes or runs on a non-segregated basis;

(3) nondiscrimination in extracurricular activities and the use of school facilities;

(4) nondiscriminatory practices in the hiring, assigning, promoting, paying, demoting, reassigning, or dismissing of faculty and staff members who work with children;

(5) enrollment and assignment of students without discrimination on the basis of race, color, or national origin;

(6) nondiscriminatory practices relating to the use of a student's first language; and

(7) evidence of published procedures for hearing complaints and grievances.

In addition to conducting reviews, the Texas Education Agency staff representatives check complaints of discrimination made by a citizen or citizens residing in a school district where it is alleged discriminatory practices have occurred or are occurring.

Where a violation of Title VI of the Civil Rights Act is found, the findings are reported to the Office for Civil Rights, U.S. Department of Education.

If there is a direct violation of the Court Order in Civil Action No. 5281 that cannot be cleared through negotiation, the sanctions required by the Court Order are applied.

TITLE VII, CIVIL RIGHTS ACT OF 1964; EXECUTIVE ORDERS 11246 AND 11375; TITLE IX, 1973 EDUCATION AMENDMENTS; REHABILITATION ACT OF 1973 AS AMENDED; 1974 AMENDMENTS TO THE WAGE-HOUR LAW EXPANDING THE AGE DISCRIMINATION IN EMPLOYMENT ACT OF 1967; AND VIETNAM ERA VETERANS READJUSTMENT ASSISTANCE ACT OF 1972 AS AMENDED IN 1974.

It is the policy of the Texas Education Agency to comply fully with the nondiscrimination provisions of all federal and state laws and regulations by assuring that no person shall be excluded from consideration for recruitment, selection, appointment, training, promotion, retention, or any other personnel action, or be denied any benefits or participation in any programs or activities which it operates on the grounds of race, religion, color, national origin, sex, handicap, age, or veteran status (except where age, sex, or handicap constitute a bona fide occupational qualification necessary to proper and efficient administration). The Texas Education Agency makes positive efforts to employ and advance in employment all protected groups.

Texas Education Agency
Austin, Texas

GE1 621 01
Spring 1991